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ABSTRACT

This newsletter briefly describes activities, projects, and publications in the areas of science education, mathematics education, and general educational in Great Britain. Short articles on activities in Ghana, West Africa, the Caribbean, and Argentina are included along with descriptions of ten other international activities. (EB)

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SEN NO 27

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ACTIVITIES IN BRITAIN - SCIENCE

1. ASSOCIATION FOR SCIENCE EDUCATION

1.1 Report of Annual Meeting, Durham, 31 December 1974 - 2 January 1975

This report, mentioned in SEN 26.5, is now available, price 45 pence, from the Publications Officer, ASE, College Lane, Hatfield, Herts.

1.2 Annual Meeting, 1976

The Annual Meeting of the Association for Science Education will be held in Oxford from 2-6 January 1976. Further details will be available in due course from the ASE Headquarters, College Lane, Hatfield, Hertfordshire.

It is expected that the British Council will once again be invited to organise a session on overseas science education and it is planned to concentrate this time on 'Curriculum Development Centres with special reference to science education work'. In addition to the overseas science education sessions there will be as usual a supporting exhibition of science education materials from many countries and a reception for overseas visitors.

2. NUFFIELD O-LEVEL BIOLOGY AND CHEMISTRY - REVISION

The first titles of the revised Nuffield Biology and Nuffield Chemistry publications are now available :

Biology		
Text 1	Introducing Living Things	£2.50
Teachers Guide 1		£3.25
Chemistry		
Teachers Guide 1		£3.50
Experiment Sheets 1		£0.45
Study Sheets (pack of 10 sets of 12 study sheets)		£6.95

Further details, including a brochure describing each course, are obtainable from Mrs Iris Sinfield, Longman Group Limited, Longman House, Burnt Mill, Harlow, Essex CM20 2JE.

3 NUFFIELD A LEVEL CHEMISTRY, TOPIC 10

In SEN 24.1.2, a warning was given about experimental work on intermolecular forces in topic 10 of the Nuffield A level course; there appeared to be a risk that a mixture of propanone (acetone) and trichloromethane (chloroform) could become explosive under certain conditions. It was recommended that this section be withdrawn from the course.

Research conducted by A J Bright of Minehead School, assisted by Dr D J Daniels of Bath University and M J Tomlinson of Ashby Grammar School has suggested that ethyl ethanoate (acetate) is a suitable alternative to propanone. The experimental results obtained were as good as those from the propanone - trichloromethane system, without the attendant dangers of the latter.

Full details are given in the September 1974 issue of 'Education in Chemistry', page 147, quoted by Professor E H Coulson in Bulletin No 62 of the Association for Science Education.

"Education in Chemistry" is published six times per year by The Chemical Society. The subscription is £9.00 per annum (£3.00 for Chemical Society members), or £1.80 for a single copy, post free. Subscriptions from members should be sent to the Membership Officer, The Chemical Society, 30 Russell Square, London WC1B 5DT; from non-members, to Chemical Society Publications Sales Office, Blackhorse Road, Letchworth, Herts SG6 1HN.

4 BSc IN SCIENCE AND EDUCATION WITH QUALIFIED STATUS - HUDDERSFIELD POLYTECHNIC

In September 1974, Huddersfield Polytechnic introduced a new 4-year course leading to the BSc (CNAA) Honours Degree in Science, giving qualified teacher status. The course is designed to produce specialised or combined science teachers for secondary or middle schools. Students may choose between the two main courses of biological science and physical science, with the possibility of some specialisation within these areas in the final year. Studies in education run throughout the course and are integrated with those in science. The third year is devoted to professional studies with the focus on science teaching, and it is during this period that the main teaching practice takes place.

Entry requirements are normally either

a GCE in five subjects with passes at Advanced level in two subjects, one of which should be a science. A further appropriate science subject is normally required to at least O level standard; or

b. ONC or OND in appropriate subjects.

Further information is obtainable from the Academic Liaison Officer, The Polytechnic, Queensgate, Huddersfield HD1 3DH.

5. UNIVERSITY OF LEEDS : CENTRE FOR STUDIES IN SCIENCE EDUCATION

The Centre for Studies in Science Education, formally established on 1 March 1970, consists of fourteen members of the School of Education who have qualifications and interests in science and mathematical education. The constitution of the Centre provides for strong links with the Science and Applied Science departments in the University, as well as with the Overseas Education Unit of the Institute of Education.

Courses of study available at the Centre are :

i. **Graduate Certificate in Education** - a course of initial training in school teaching for graduates. Further information may be obtained from the Administrative Assistant, Department of Education, The University, Leeds LS2 9JT.

ii. **M A in Education** - a one-year full-time course of advanced study and research training. Further information from Professor D Layton, Department of Education.

iii. **In-Service Courses of Training** - a wide range of courses is offered and a number of science teacher groups meet regularly. Further information from the Organiser of In-Service Training, Institute of Education, University of Leeds.

iv. **Degrees of MPhil and PhD** are taken by research.

The Centre has long-standing research interests in the growth of scientific and mathematical concepts in children's thinking. Other fields of research are science curriculum theory, the history and sociology of science education, the development and testing of methods of examining, computer-based learning of science and mathematics, and the diffusion of science curriculum innovations.

For information about publications available from the Centre, including "Studies in Science Education" (SEN 23, 18.5 and 24,22.19) see SEN 27 18.2.

6. INDEPENDENT LEARNING IN TERTIARY SCIENCE EDUCATION

This is the title of a two day conference to be held by the School of Chemistry, Thames Polytechnic, in association with the Chemical Society on 8th and 9th July 1975. The following topics will be examined at the conference:

- Should curriculum design be for or by the independent learner ?
- Teaching methods and student learning
- Individual strategies in human learning
- Problems and challenges in independent learning
- Running a self-teaching laboratory in biology
- Trials of self-instructional methods in undergraduate medical education
- Self instruction in the laboratory
- The problems and potential of independent learning in engineering education
- Many arts, many skills

Further details of the conference are obtainable from the Academic Registrar, Thames Polytechnic, Wellington Street, London SE18 6PS.

7. SYMPOSIUM ON CHEMICAL EDUCATION - YORK, 7 - 11 APRIL 1975

A two day Symposium on Chemical Education was arranged by the Education Division of the Chemical Society as part of the Annual Chemical Congress held at University of York from 7 - 11 April 1975. The theme of the

Symposium this year was 'Problems of Innovation'. Speakers included Lord James of Rusholme on the subject 'Education through Chemistry' and Professor J A Campbell from Harvey Mudd College, California, USA who described the Chemistry Education Materials (CHEM) Study Project. Professor Campbell's lecture marked the inauguration of joint meetings between the Education Division of the Chemical Society and the Chemical Education Section of the American Chemical Society.

On the second day the participants split into three working groups to discuss ways in which the Education Division could contribute to British Chemical Education. The recommendations of the working groups were then discussed in a plenary session under the Chairmanship of Mr N Booth, Department of Education and Science.

On the final day of the Congress Professor Campbell gave a highly stimulating lecture-demonstration to school children entitled 'Surprises in the Teaching of Science'.

8. **SCIENCE 5/13** (SEN 19.3, 26.6)

The most recent publication in the series produced by the Science 5/13 Project is :

Using the Environment Volume 4 - Ways and Means - this volume deals with ways and means of providing the facilities, equipment and raw materials children need for all stages of their indoor investigations, and resulting activities on their return to study areas in school. It includes ideas for developing the school grounds, materials for long-term investigations, fieldwork outside school, indoor techniques and provision of a resources area.

9. **SCHOOLS COUNCIL INTEGRATED SCIENCE PROJECT - PATTERNS 4** (SEE SEN 12.4, 13.4,14.3, 19.1, 19.2,23.2,26.7)

The most recent issues of the SCISP series "Patterns" have been :

Technicians Manual 4 - Outlines all details necessary for the preparation of work for "Patterns 4". It includes preparation guides, equipment lists, details of materials, lists of suppliers, books and other reading aids.

Topic Book - Human Groups

Topic Book - Man and the Urban Environment

Topic Book - Darwin and Evolution

These three Topic books are designed to accompany "Patterns 4".

10. **NUFFIELD SECONDARY SCIENCE : AN EVALUATION,** DOROTHY J ALEXANDER, SCHOOLS COUNCIL RESEARCH STUDIES PUBLISHED BY MACMILLAN EDUCATION LIMITED, PRICE £2.95.

The attitudes of pupils towards science and the relevance of science to society deteriorate while using Nuffield Secondary Science Teaching Project materials, although their attitude to science teachers improves: these are some of the results of the Schools Council's recently published report.

The evaluation concentrated on 3 main aspects: i. the concept of the significance of Nuffield Secondary Science to the pupils, ii. the emphasis on pupil involvement and iii. the possibility of a change in attitude to science on the part of pupils where schools were using these materials. It took the form of a questionnaire to teachers, opinion polls of 1,239 pupils designed to test any change in their attitudes to science and school in the period 1969-70, and direct observations over the year 1969-70 of 12 classes using the material for the first time.

The questionnaire showed that, although teachers' confidence in the usefulness of Secondary Science was maintained, they found it difficult to make the work of real significance to their pupils. In giving reasons for their choice of project material for their own science scheme, 54% gave reasons which were either subject based or determined by the need to conform to approved CSE policy; 23% gave reasons concerned with their own interest; and only 17% quoted reasons which indicated that relevance to the pupil was the dominant factor. It seems that while changes in factual content can be readily appreciated by teachers, changes in teaching style and in total philosophy are much less readily appreciated. However, direct observations revealed some encouraging alterations in teaching styles to allow for increase in pupil participation

The deterioration of pupils' attitudes towards science is partially attributed by the report to this " attitude gap " between the project team and trial teachers. They also point out that the project is designed for use after the first 2 years of secondary education, at a time when (according to other research which they cite), pupils' attitudes to the study of science generally deteriorate to some extent. Besides, the participating schools were only studied over a single year (1969-70).

However, the improved attitude of pupils to science teachers is an encouraging sign; the report argues that at least a beginning may have been made, in narrowing the attitude gap between teacher and pupil : a desirable aim in the development of any course, and particularly important in Nuffield Secondary Science. The report urges that more and longer in-service training, and "sustained support" from the project team are needed to enable teachers to understand fully the opportunities available to them.

11. MATHEMATICS TEACHER EDUCATION PROJECT

The project has been set up to produce materials to help improve the preparation of mathematics teachers for secondary schools. It is primarily designed for use in one-year postgraduate courses, but the materials would also be useful in the training of non-graduate students for secondary schools, and in in-service training. This Mathematics Teacher Education Project will complement the Science Teacher Education Project (SEN 15.4, 18.16, 24.2), although the resulting materials will take a rather different form.

The programme of work has grown out of discussions at two conferences organised in 1972 and 1973 by the Association of Teachers in Colleges and Departments of Education (Mathematics Section) (ATCDE) and the University Departments of Education Mathematics Study Group (UDEMSG). The first conference outlined a number of specific problems and topics which were common to many postgraduate courses. A booklet resulted from the conference and this provided a useful exchange of information, experience and material between colleges and departments. The second conference, a report of which appeared in "Mathematical Education for Teaching" No 2, December 1973, discussed the aims and objectives of each postgraduate course.

From these conferences particular areas were selected for special development, and working groups of mathematics tutors from colleges and universities throughout Britain are now preparing materials on seven different themes. Initially the working groups are concentrating on ideas for tutors, but it is intended that this will lead to the production of materials for students in due course. The areas of study are :

1 **Mathematical awareness**

A new graduate in mathematics is probably used to working in a very formal way, which is not an appropriate preparation for teaching pupils who vary greatly in ability, age and interests. How can a student's attitude to his subject be changed so that he can gain a new awareness of his subject and adopt a child-centred, creative approach? He needs to appreciate how mathematics can be presented in many interesting forms, and extracted from a wide variety of situations.

2. **Teaching Styles and Use of Materials**

The new graduate has to come to terms with many unfamiliar teaching situations. To help him cope with such a variety, he needs a knowledge of many possible approaches, for instance in class teaching, organisation of practical work, use of discovery methods, project work, individual work and open ended investigation. There are a number of factors restricting the use of all approaches during a training course; however it is useful to explore ways in which a student may encounter the range of possibilities open to him, and be led to consider a more experimental approach to his own teaching.

3. **Children's Thinking**

Most graduate certificate courses include such topics as concept development, the development stages of Piaget, development of schema, creative thinking and so on. It is difficult, but particularly important, for mathematics graduates to be able to use this knowledge in the planning of their teaching. The problem is to find ways in which a subject method course can include activities which enable students to extend their knowledge in this area, and to provide some links with theory courses.

4. **Mathematics for Special Groups**

This group is concerned with finding ways in which training can consider the needs of special groups, which have arisen as the result of the diversification of courses available to pupils. These include CSE and non-examination candidates, slow learners, remedial groups, mixed ability groups, and mathematics for biologists. The new teacher also needs to know how "feeder" primary and middle schools approach mathematics teaching.

5 **Resources**

There has been a vast increase in the use of teaching aids such as films, film loops, television, close circuit television, practical work, slides and reference books. How is it possible to short cut experience and provide the student teacher with an awareness of what is available, and the ability to exploit it effectively?

6. **Links with other Subjects**

The link between the teaching of mathematics and physical sciences has always been clear but the mathematics teacher needs to explore his subject as a tool or language of other subjects, such as biology, geography, art and music. For instance, statistics and set notation are of use to biologists; conversely, the mathematician can find new applications for mathematical skills (as in Sixth Form Mathematics Curriculum Project, and the Mathematics for the Majority Continuation Project). His training should provide a new view of the links between mathematics and other subjects.

7. **Topics to be taught to Graduates**

This group will examine ways of filling in the gaps in students' knowledge of the modern school mathematics syllabus. For instance, what is the best way of providing them with insight into transformation geometry, whose content, approach and educational purpose is very different from the traditional Euclidian syllabus? Particular problems arise with students who have followed traditional courses, or joint degree courses, or who have graduated in subjects other than mathematics. They may need considerable instruction in such important subject areas as mechanics, statistics and probability and operations research.

The project is being supported with a grant from the Nuffield Foundation for a period of eighteen months. It is directed by Mr G T Wain of the University of Leeds, and Dr D Woodrow of Manchester College of Education, who will edit the materials produced by the working groups. It is hoped that these will be published in some form in early 1976.

A conference will be held at the University of Nottingham on September 17, 1975 to discuss the progress of the working groups, and to inform those in the field of mathematics education about the project.

Further information about the project, and the conference at Nottingham, may be obtained from : Mr G T Wain, Centre for Studies in Science Education, The University, Leeds LS2 9JT.

12. WHAT'S GOING ON IN PRIMARY MATHS - REPORT BY THE PRIMARY MATHS PROJECT

One of the current Schools Council projects is the Primary Maths Project (see SEN 20.10,21.13,23.12), based at the School of Education, University of Reading. The project is attempting to discover what is happening in the complex pattern of primary mathematics in Britain, and it has issued a number of short reports. One of these is the particularly useful one: "What's Going on in Primary Maths".

This report is descriptive, not prescriptive. Information for it was gathered from a detailed questionnaire sent to a random sample of primary schools in 12 different local authority areas in England and Wales. Topics dealt with include the patterns of class organisation, the balance between individual, group and class work that is done, the teaching materials that are used, the extent to which children help each other with their mathematics work, the emphasis placed on the learning of tables, and the extent to which teaching apparatus is used. Teachers were also asked to assess those themes of primary mathematics that they considered most important, and to state their major concerns and reservations about the primary mathematics scene as it exists in the schools at present.

The report clearly indicates the very wide variation in practice in British primary schools at present, though it also indicates trends towards a somewhat greater uniformity than existed a few years ago. It is a useful reference work for those concerned with the teaching of mathematics to young children.

Copies of the report may be obtained free of charge from the Director, Schools Council Primary Maths Project, University of Reading School of Education, London Road, Reading, RG1 5AQ.

13. MANIPULATIVE SKILLS IN SCHOOL MATHEMATICS : THE SCHOOL MATHEMATICS PROJECT

One of the major criticisms which has been levelled against "modern mathematics" at school level has been that insufficient importance is given to competence in routine skills, particularly those of arithmetic. The emphasis placed on understanding fundamental principles is said to be at the expense of children being unable to do numerical computation with speed and accuracy. The situation has been compared to that of a person who knows all about the workings of the internal combustion engine but who cannot drive a car.

The School Mathematics Project is the major British developmental project in secondary mathematics, and here in the pamphlet entitled "Manipulative Skills in School Mathematics", is SMP's response to this criticism. The difficulty of specifying and measuring manipulative skills in school mathematics is discussed, and the many influences - both within education and from outside - which bear upon questions of "standards" are outlined. There follows a survey of the modus operandi of the SMP, and an indication of its intended spheres of activity in the next few years, all of which bear directly or indirectly on the question of manipulative skills. The pamphlet incidentally includes a useful list of names and addresses of those who are at present centrally concerned with the various aspects of the Project's work, and who may be approached for further information.

Copies of the 24 page pamphlet may be obtained free of charge from the SMP Office, Westfield College, Hampstead, London NW3 7FT.

14. SCOTTISH MATHEMATICS GROUP

14.1 **Modern Mathematics for Schools** - (See SEN 18.19 and 24.11).

Newsletter No 5 dated February 1975 has recently been published and attention is drawn to the celebration of the first 10 years of the Scottish Mathematics Group. A short article reviews the activities of these first ten years and information regarding new publications is given.

The revision of 'Modern Mathematics for Schools' has now reached book 9 and mathsheets for use with books 2 and 3 will be available later this year. A further publication, 'Mathematics applied to Mechanics' is intended for 6th year studies towards A level and the Certificate of 6th year study.

Copies of the newsletter and further information may be obtained from Blackie & Chambers, 11 Thistle Street, Edinburgh EH2 1DG.

14.2 Scottish Mini-Computer Users Groups

In SEN 24.12.2 we reported the successful use of a travelling mini-computer centred upon Aberdeen which is used to bring practical computer experience to pupils in Northern Scotland. Local Authorities in other areas have now purchased their own small computers and an association has been formed between them. All are circulating their computers round groups of schools in order to support the teaching of computer education courses following the lines recommended by the Scottish Education Department.

At present the Authorities represented are Renfrewshire, Lanarkshire, Ayrshire and the cities of Aberdeen and Edinburgh and the group meets about four times a year for discussions and demonstrations on teaching materials and computer packages.

Further information regarding activities of the group may be obtained through the Scottish Computer Education Group, Centre for Computer Education, Moray House College of Education, Holyrood Road, Edinburgh EH8 8AQ.

ACTIVITIES IN BRITAIN – GENERAL

15. MATHEMATICS FOR BIOLOGISTS – A REPORT OF THE ROYAL SOCIETY/INSTITUTE OF BIOLOGY BIOLOGICAL EDUCATION COMMITTEE WORKING PARTY ON MATHEMATICS FOR BIOLOGISTS.

The Royal Society Education Committee invited the joint Royal Society-Institute of Biology Biological Education Committee to look at the mathematical requirements of those taking biological courses. This followed a report from the joint Physics Education Committee (SEN 22.11), and the setting up of a working party by the British Committee on Chemical Education on the mathematical requirements in physics and chemistry courses respectively. Their report has been published in the Journal of Biological Education 8. (5) pages 267-276.

The working party on mathematics for biologists agreed the following terms of reference:

1. To report on the problem of providing the mathematical training required for those studying biology at various levels and to make recommendations for improving this provision.

2. To comment on the problems of communication between mathematicians and biologists, and to make recommendations to alleviate these. The problems arise both during the initial training of biologists, and during retraining, and concern both the extent and the relevance of the mathmatics taught to biologists.

3. To report on the range and type of mathematics required by biology students at different stages and for different specialisms.

4. To comment on the appropriate reports of other working parties insofar as they are available.

The report comprises the following:

a. **Mathematics required for biology courses at secondary and tertiary level, with biological examples.**

b. **The provision of training and retraining at secondary and tertiary level.**

c. **Comments on the reports of the other two working parties.**

d. **Recommendations.**

It was recommended that the joint Biology Education Committee sponsors and encourages the following activities:

i. **Meetings**

a. Joint meetings should be held of teachers of mathematics and of biology at secondary and at training college level, to establish how the mathematics required is presented in class, what are the common problems encountered by teachers and anticipated of pupils, and what contributions the mathematics teachers can make towards easing these.

b. Seminars, lectures and conference should be organised in a number of parts of the country where the mathematically inclined biologist or a mathematician sympathetic to biology should speak.

c. In many cases it would be valuable to organise these meetings to cover all the sciences, and not just biology and mathematics.

ii. **Courses**

a. Courses should be arranged to familiarise biology teachers with mathematics demonstrably useful to their own teaching requirements.

b. Joint courses for mathematics and biology teachers should be arranged so that both sides work together on the more mathematically orientated parts of existing biology courses.

c. 1 - 2 week courses should be organised where invited speakers lecture on topics in biology which use mathematics.

iii. **Further study of the problem**

A new small working party of mathematicians and biologists should be set up. This working party would study the mathematics needed and used by biologists in schools. The intention would be to write, validate in the classroom and eventually publish pupils' and teachers' texts and other supplementary materials for the teaching of mathematics to biologists.

The Journal of Biological Education is published bi-monthly by the Institute of Biology, 41 Queens Gate, London, SW7 5HU. The subscription rate for all countries except those in North and South America is £10.00; that for

North and South American countries is $ 25.00.

Copies of this report may be obtained from The Education Officer, Institute of Biology, on receipt of a large postage paid addressed envelope,

16. UNIVERSITY OF BIRMINGHAM – DEGREE OF BPhil (EDUCATION) IN SCIENCE/MATHS. EDUCATION.

The full time post-experience course at Birmingham University School of Education, leading to the degree of BPhil (Ed) has recently been extended to include the opportunity to specialise in science or mathematics education.

The new options, available from October 1975, are "Curriculum and Teaching: Mathematics" and "Curriculum and Teaching: Science"; these will form a major component of the degree course. It is intended that visits, laboratory and field work and discussions will provide data on professional issues and these will be considered in relation to relevant theory.

In addition. BPhil students take courses in two areas of related study. Those choosing science teaching as an option will normally be required to choose Curriculum Theory, Planning and Practice as one of their additional courses.

Candidates should possess:

i. A degree or a certificate of education obtained after a 3 year initial course of professional training, or the equivalent.

ii. At least 2 years of teaching experience.

Any offer made to an overseas candidate will in every case be subject to confirmation by interview after arrival in Britain. At this interview the Selection Committee will either confirm the candidate's admission to the course for which he has applied, or if not satisfied of his ability to take that course, will offer instead an ad hoc course arranged to suit his interests and ability.

Further details are obtainable from W. Curr (Education M7) School of Education, University of Birmingham, PO Box 363, Birmingham B15 2TT.

17. THE SCOTTISH CENTRE FOR MATHEMATICS, SCIENCE AND TECHNICAL EDUCATION (SEN 23.15).

The latest publications from the Centre are:

Memorandum No. 18 Electrostatics for Certificate of Sixth Year Studies (price 32p)

Bulletin No. 4
The fourth in the series of occasional bulletins was issued in February 1975. It includes a selection of Mathematics books, catalogues and journals of use to teachers in preparing third and fourth year non-certificate courses. It also gives news of current development projects: the Maths "O" grade course, Maths for General Education, Certificate of Sixth Year Studies in Biology, and projects in Technical Education. The remit to the Working Party on "Science Education for the Least Able" (SEN 23.15.6) has now been extended to include provision for children of all ability levels.

Copies of the Bulletin are available at 20p per copy (post paid)

Science: A Curriculum Model for the 1980's - Occasional Paper No. 1
This paper has been prepared by the Scottish Central Committee on Science, to serve as a basis for consideration of the future development of the science curriculum in secondary schools. Its scope ranges from details of presentation to the wider relationship of science teaching to overall education.

The report includes an account of the general objectives of science education, and the revisions in syllabus necessary to achieve these. The recommendations, which are being considered by the Consultative Committee on the Curriculum, are based broadly on the belief that the school curriculum should not be unduly biassed, either towards or away from science, but that science is an essential component in the education of everyone throughout the first four years of schooling. They propose that (i) an integrated science course in the first two years of secondary education would form the best foundation for later studies, and (ii) to enable all three sciences to be studied at "O" grade, two new examination subjects, physical science and biological science, be introduced.

Further information and copies of publications may be obtained from the Director, Scottish Centre for Mathematics, Science and Technical Education, College of Education, Park Place, Dundee DD1 4HP, Scotland.

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PUBLICATIONS

18.1 NUFFIELD SCIENCE AND PENGUIN EDUCATION

All Nuffield Science publications will in future be published by the Longman Group Limited.

Longmans have been closely associated with the Nuffield Foundation since the commencement of the Projects and were in the past jointly responsible with Penguin for the O level and combined science material.

Longmans have been responsible for Secondary Science, and, as a result of the recent changes, will now be solely responsible for the publication and distribution of the following:

Nuffield Combined Science

Nuffield Ordinary Science

Nuffield Secondary Science

Nuffield Advanced Science

As before, enquiries may continue to be sent to the Nuffield headquarters at Chelsea College Centre for Science Education Bridges Place, London SW6.

18.2 CENTRE FOR STUDIES IN SCIENCE EDUCATION, LEEDS UNIVERSITY – PUBLICATIONS

1. **Studies in Science Education** (SEN 23,18.5 and 24,18.5)

The second edition of this annual review of research and critical issues in science education, edited by Professor David Layton, has now been published. The contents are as follows:

Articles

P.L. Gardner, Monash University, Australia. Attitudes to Science : A Review

Sally A. Brown, University of Stirling. Cognitive Preferences in Science : Their Nature and Analysis.

W.H. Brock, University of Leicester. From Liebig to Nuffield : A Bibliography of the History of Science Education.

J.J. Smolicz, University of Adelaide, and **E.E. Nunan**, Salisbury College of Advanced Education. The Philosophical and Sociological Foundations of Science Education : The Demythologizing of School Science.

Research Notes

The Royal Society and Education – C.C. Butler

International Council of Associations for Science Education – Dennis G. Chisman.

Science Education dissertations in Australian Universities 1967 - 1973

Book Reviews

Annual subscription in the United Kingdom and overseas (except USA) is £2.00, including postage; in the USA, $ 6.50. Remittances from overseas should be in sterling, and cheques, etc. should be crossed and made payable to The University of Leeds. Subscriptions, orders and enquiries should be addressed to The Business Manager, Studies in Science Education, Centre for Studies in Science Education, The University, Leeds LS2 9JT.

2. **Objective Testing : A Guide for Science Teachers**, E.W. Jenkins, price 30 pence

3. **Biological References from The School Science Review and The Journal of Biological Education 1960-72**, M. Sheila Gosden, price 45 pence.

This index attempts to make readily available to teachers and lecturers the many biological articles which have been written during a period of considerable curriculum change. It is intended that supplementary booklets will be produced to keep the index up to date.

4. **Research in Science and Mathematics Education** – A list of theses for higher degrees in British Universities 1968 - 1971, price 20p post free; 1971 - 1973, price 10p post free.

5. **References of Use to Teachers of Mathematics**, D.C. Carter and G.T. Wain, price 60p.

6. **Bibliography of Resources for Chemistry Teachers**, E.W. Jenkins, price 60 pence (see SEN 24,22.4).

These publications are all obtainable from The Secretary, Centre for Studies in Science Education.

18.3 **MODERN MATHEMATICS FOR EAST AFRICA.** P.M.B. Jones and T.D. Morris, Allen and Unwin, £1.25.

This book is a revision course suitable for secondary students in their final year of preparation for GCE 'O' level in one of the 'modern' mathematics syllabuses. It was written initially to meet the needs of such students in East Africa, but the few references that are specific to that region are no hindrance to the book's being of value in other parts of the world.

The authors are both very experienced teachers and examiners, and the book is down to earth and practical throughout. It starts with advice about answering an examination paper, and then follows with a summary of the definitions and formulae necessary in a modern O level mathematics examination. The bulk of the book surveys the major themes of modern syllabuses at this level, summarizing the salient theory and giving plenty of worked examples and exercises of O level standard.

As well as being of potential value to candidates, the book could be of use to teachers as a useful source of further examples and specimen examination papers.

18.4 **'MATHEMATICS FOR SCHOOLS', edited by Harold Fletcher, published by Addison-Wesley.**

Infant : Level 1
7 pupils' books for ages 5 - 7
1 teachers' resource book

Junior and Middle : Level II
10 pupils' books, for ages 7 - 13
5 teachers' resource books

The publication of this series is now complete. Level I covers the infant years of education, while the Level II books cover what is in British terminology the junior and middle school years. Together, the books cover a child's mathematical development from early sorting activities right through to the beginnings of transformation geometry, probability, trigonometry, logarithms and the use of the slide rule. The approach is an integrated one, and is based on the "contrived discovery" of a mathematical concept, followed by the development of structural understanding of this concept.

The series is perhaps the most widely used of all the modern primary courses in Britain. One of its strengths is that it is written by a team of people who have had a wealth of experience as primary school mathematics teachers, and it was subjected to trials in schools before being published. The pupils' texts, particularly the early ones, are partly in the nature of workbooks, and to that extent must be regarded as expendable. However, in many less well-endowed schools the children are told to use pencil, lightly, and to rub it out later. The teachers' resource books not only contain notes on teaching the pages of the children's books, but also material on the mathematics underlying the children's work, suggestions for necessary concrete materials, games and other enrichment activities. These teachers' resource books are an integral part of the course; far too many schools in Britain attempt to use the pupils' books without reference to the corresponding teachers' resource books, and thereby demonstrate that it is possible to use even a good course badly. This is a good course, and it could be studied with profit by those concerned with curriculum development and the production of pupils' materials for primary mathematics in any country.

18.5 **INTRODUCING CHEMISTRY** : J.V. Binns, D. Futcher, S. Pardham, J. Rank, J.W. Steward, P.J. Towse. Published by Edward Arnold.

This set of books provides a complete 4 - 5 year course in chemistry up to ordinary level/school certificate standard. Although the books were written primarily for use in East Africa, they will be suitable in any country in which secondary school chemistry courses approximate to 'O' level in scope and standard. The language throughout is simple and concise, and should be readily understood by teachers and pupils using English as a second language.

Much of the Nuffield philosophy is to be seen in the course, although the approach and layout used are similar to those of the East African School Science Project (SSP). The course is designed as a series of experiments, mainly pupil-based, the results of which lead pupils to an understanding of the principles covered. Instructions for carrying out these experiments are given in the work books, and space provided for the pupils to record their results, usually as answers to carefully structured questions. Quantitative work for the most part is postponed until book 2, ie the 3rd year of the course. SI Units are used throughout. Pupils' Book 2 contains in

addition sections on "Content" to provide the necessary background of factual information.

The Teachers' Resource Books contain comprehensive notes about the experiments including teaching approach, practical instructions in setting them up, practical and theoretical points to stress and lists of useful data. The emphasis is on using as simple apparatus as possible, and there is a very useful appendix on the construction of items of equipment from cheap, locally available materials. There is also in the appendix, a list of apparatus and chemicals needed for the course, and a most welcome section on laboratory safety and first-aid.

Pupils' Book 1	1974	pp 89	70p
Teachers' Resource Book 1	1974	pp 123	£1.50p
Pupils' Book 2	1975	pp 177	£1.60p
Teachers' Resource Book 2	1975	pp 168	£3.10p

18.6 TEACHING AND LEARNING IN CHEMISTRY, ed. D.S. Trickey. pub. Sheffield Polytechnic, 2nd printing (revised) 1973. pp. 90, price 50p.

This publication is the proceedings of a conference held at Sheffield Polytechnic in association with the Chemical Society Education Division. The conference aimed to bring together chemistry teachers from secondary and tertiary sectors of education to take a closer look at some of the methods of teaching and learning. The booklet also includes a list of 63 firms and publishers and their addresses who provided material for an exhibition of educational technology software at the conference.

Papers and authors are as follows:

1. Teaching and Learning in Chemistry Today and Tomorrow, by
   Professor M.J. Frazer
   University of East Anglia
2. The Nuffield Approach and its Consequences, by
   Professor E.H. Coulson
   Chelsea College of Science and Technology
3. Courses With and Without Lectures, by
   Professor L.R.B. Elton
   University of Surrey
4. Teaching by Discussion in Small Groups, by
   Professor R.M. Beard
   University of Bradford
5. Visual Media in Students' Learning Experiences, by
   Professor R.F. Kempa
   University of Keele
6. Self Learning Methods in the United States, by
   C.V. Hancock
   Bolton College of Education (Technical)
7. A Chemistry Learning Aids Laboratory, by
   P.D. Groves
   University of Aston
8. Learning Techniques at the Open University, by
   Professor L.J. Haynes
   Open University
9. Structural Communication Units in Chemistry, by
   Dr. G. Robinson
   Blackburn College of Technology and Design

Copies of the booklet are available from Dr. D.S. Trickey, Sheffield Polytechnic, Sheffield S1 1WB, price 50p, post free, payment in advance only.

18.7 ALTERNATIVES TO THE LECTURE IN CHEMISTRY, ed L.J. Haynes, P.J. Hills, C.R. Palmer and D.S. Trickey, Chemical Society, 1974, pp 89, price £1.00

This booklet, proceedings of a symposium held at the Autumn Meeting of the Chemical Society at the University of East Anglia in September, 1973 consists of 13 papers and abstracts written by teachers in schools, colleges, polytechnics and universities. The papers describe experiments, and their evaluation, in which formal

lectures in chemistry have been replaced, at least in part, by more student-active teaching methods; viz: use of laboratory seminars, structured booklets, buzz groups, gaming and discovery learning with video tapes and models.

Copies are available £1 post free (£0.75p to members of the Chemical Society Education Division) from Miss E.S. Goodall, The Chemical Society, Burlington House, London W1V 0BN.

18.8 **"TEACHING MATERIALS FOR DISADVANTAGED CHILDREN"** Schools Council Curriculum No.5 published by Evans and Methuen Educational, price £1.25.

This bulletin examines the use of a wide variety of curriculum projects with "disadvantaged children" – defined as the 15–20% of pupils who are the least successful at school. It discusses the reasons for their relative failure and the relevance to their problem of the newer curricula in many subjects. Of particular interest to science teachers will be the chapter covering the Nuffield Junior Science, Science 5-13, Nuffield Combined Science, and Nuffield Secondary Science Projects : this includes reports of the reactions of schools using some of these projects with disadvantaged children and the modifications found to be required.

OVERSEAS ACTIVITIES

19. GHANA

Ghana Association of Science Teachers (GAST)

The 20th Anniversary of the foundation of the Ghana Association of Science Teachers will fall in November 1975. To mark this occasion GAST is organising a special workshop in Accra from 3–8 November 1975 of prominent science educatorsand leaders of Science Teachers Association from Africar countries. The workshop will be financed, in part, by UNESCO through a contract with the International Council of Associations for Science Education (ICASE).

The aims of the workshop will be to promote exchanges of ideas and information among science teachers associations in Africa, to discuss their role in promoting curriculum development, materials production and teacher education, and to formulate proposals for future co-operation among the associations.

Further information can be obtained from Mr. Ohene Asare, General Secretary of GAST, Ministry of Education Central Inspectorate, P.O. Box M188, Accra, Ghana.

20. WEST AFRICA

Project in Advanced Mathematics

In 1968 the West African Examinations Council approved a new syllabus for mathematics A level for use in Ghana, Sierra Leone and the Gambia. A group of teachers meeting in Ghana agreed to collaborate in producing a series of texts to cover the material for this syllabus and an approach was made to the School Mathematics Project in England for permission to adapt the SMP series (Advanced Mathematics Volumes 1-4).(See SEN 18.18.5).

The group attempted to incorporate a number of factors in the new adaptation. For example, students preparing for the examination may have a background of traditional mathematics or may have taken a more modern course and the text had to meet the needs of both groups. Furthermore it was decided to alter the original order of the SMP books to assist, for example, the teaching of science and other subjects. Finally the particular needs and background of students in Africa had to be borne in mind and the resulting course is largely modern both in approach and content, but not as radical as some.

Production of the materials was undertaken at first by the provision of supplementary material for use with the original SMP texts. Schools using this commented on it and on the printed chapters and the results were accumulated to compile revised chapters. The result is a series of three textbooks which will cover the work in a two year sixth form course and the first two books have recently been published by Cambridge University Press.

The course should prove invaluable to countries following the West African syllabus although the authors note that they hope it will prove useful in other countries where a modern syllabus is being followed. Two main themes run through the series: theory and applications of mathematics, relating to number and to space. It is intended to give a broad general background in mathematics both in the fundamental theory and its applications in the fields of mechanics and other aspects of theoretical physics and statistics. A pass at GCE O level or School Certificate in Mathematics is pre-supposed but knowledge of topics which usually belong to the subject "additional mathematics" at O level is not required.

Further information on the project books may be obtained from Cambridge University Press, Bentley House, 200 Euston Road, London NW1 2DB.

21. CARIBBEAN

Integrated Science and Teacher Education. This is the title of the final report of the Caribbean Science Educators Workshop, October 1–13 1973. The Workshop was set up and sponsored by UNESCO and CEDO (now merged with the British Council) as one of the series of regional workshops in science education that UNESCO has organised in different parts of the world in recent years. Its main objective was to provide an opportunity for exchange of information among science educationists in the Caribbean region, particularly those involved in integrated science. Particular emphasis was placed on teacher education for integrated science teaching and on the production of materials for use in teacher training courses.

This 258-page report is divided into 3 parts followed by a number of appendices giving detailed information about the Workshop itself. Part I describes the background to the Workshop and lists the conclusions to be drawn from it. There is also a useful description in tabulated form of the status of science education in the

Caribbean countries. Edited versions of the lectures given during the Workshop comprise Part II of the report. Topics covered include the aims and objectives of integrated science teaching, evaluation of new science curricula in the Caribbean, teacher education for integrated science, science for C streams (weaker students), and innovations in teacher education.

During the second week the Workshop divided into 4 working groups. Each group produced resource materials and these formed Part III of the report. The first of these is a blueprint for an O-level integrated science curriculum, complete with guidelines and objectives, structure, outline syllabus, example for a unit, examination structure, and brief notes on teacher preparation, laboratory facilities and evaluation of the curriculum.

The second group produced the structure of a teacher education course for integrated science at the junior secondary level. This consists of a list of aims and behavioural objectives, teacher activities and syllabus content with a more detailed treatment of 4 of the units.

"Let's go to Market" is the title of the primary science unit produced by the third group. There is a statement of broad aims and objectives followed by detailed lesson plans for a number of activities within the unit.

Finally there is a teacher education integrated science unit entitled "Moving Things". It is split into 3 sub-units, each with its job card, resource material and evaluation sheet, and is so designed that the student teacher can work his way through it on an individual basis, needing only guidance from his tutor.

Science educators outside the Caribbean region will find Part III of the report particularly useful. The materials produced provide ideas and activities which, suitably adapted, can be used in many other parts of the world. Education Projects Department in London have a limited number of copies of this report, and anyone involved in integrated science curriculum development or teacher training may obtain a copy by applying to his local British Council office.

22. ARGENTINA

Conceptos De Matematica

This is the only Spanish language journal in the world specifically devoted to mathematical education. It originates in the Argentine, the Editor being Dr. Jose Banfi, whose address is Fernandez Blanco 2045, Buenos Aires, Argentina.

A recent issue, number 30, April - June 1974, was devoted largely to mathematics education in Britain. Back numbers of the journal are available from the Editor. The annual subscription is Argentine $13.

23. DIRECTORY OF SCIENCE TEACHERS' ASSOCIATIONS WORLD WIDE.

A revised issue of the Directory of Science Teachers Association Worldwide has been compiled by the Association for Science Education in Britain on behalf of the International Council of Associations for Science Education (ICASE).

The Directory consists of information about science teachers' associations obtained as a result of the questionnaire sent out by the Association for Science Education in Britain in January 1973. The present edition contains a number of amendments and additions received as a result of the first issue and is believed to be correct as at October 1974. It is intended to issue revised sheets and additional entries as more information becomes available.

The Directory gives basic information about the various science teachers' associations throughout the world including the name and address of the secretary or other official correspondent, the membership, the number of journals and other publications issued and a brief note of the principal regular activities.

Copies of the Directory are available free of charge to science teachers associations who are members of ICASE. Additional copies for teachers and others directly involved in science education may be obtained from the ASE, College Lane, Hatfield, Hertfordshire, at the price of £1.50. For other interested persons or organisations the subscription price is £2.50. These prices include an updating service until December, 1978.

24. INTERNATIONAL COUNCIL OF ASSOCIATIONS FOR SCIENCE EDUCATION (ICASE)

The first full meeting of ICASE since the Foundation Meeting in Maryland, USA in April 1973 will be held in Oxford from 28 - 31 December 1975 just before the annual meeting of the ASE which will also be held in Oxford from 2 - 6 January, 1976. (See SEN 27.1).

Membership of ICASE is now more than 20 including Science Teachers Associations from the following countries: Australia; Barbados; Canada; Denmark; Ghana; Guyana; Hong Kong; India; Indonesia; Ireland; Italy; Jamaica; Lesotho; Netherlands; Philippines; Trinidad; UK; USA; Zambia.

The Oxford meeting of ICASE will be held in conjunction with an international seminar on Evaluation of Integrated Science Education sponsored by UNESCO. A number of specialists have been commissioned by UNESCO to prepare papers on specific aspects of evaluation. These specialists will meet at the seminar to produce material based on their papers for an issue in the UNESCO series 'New Trends in Integrated Science'. The coordinator and editor of the proceedings will be Dr David Cohen, Macquarie University, Australia. ICASE delegates will be invited to attend some of the sessions on evaluation but the seminar is not open to other participants since the aim is to organise a small working group for maximum output of written materials.

25. SECOND WORLD CONFERENCE ON COMPUTERS IN EDUCATION, MARSEILLES, FRANCE, 1 - 5 SEPTEMBER 1975.

Advance notice of this conference, organised by the International Federation of Information Processing (IFIP) was given in SEN 26.34.3.

The first IFIP conference was held in Amsterdam in August 1970, and was concerned mainly with future projects in computer assisted instruction. This, the second conference, will differ in emphasis, in that it will deal mainly with descriptions of on-going experiments, with results and critical evaluations.

The conference will comprise 70 sessions, and include the following topics:

a. Information in physics, mathematics, biology, social sciences, fine arts etc., at the secondary and tertiary education levels.

b. Computer assisted instruction (CAI): theory, principles, methods and case studies.

c. Adult education in informatics.

d. Informatics for specialists and for managers.

e. Manpower needs and planning of informatics education.

f. Developing countries are represented at many sessions, and 5 sessions are entirely devoted to their particular needs: informatic literacy, the value of CAI, transfer of experience from developed to developing countries, national planning of computer education, etc.

g. About 20 panel discussions on controversial subjects such as: how to decrease the cost of CAI, which programming language to use, the social impact of CAI, change in behaviour of teachers and students when using CAI.

An exhibition of educational hardware and software products will be held in the conference hall, and will include a number of demonstrations of these materials.

Further information and application forms may be obtained from: AFCET (Association Francaise pour la Cybernetique Economique et Technique), Secretariat of the IFIP Conference, 156 Boulevarde Pereire, 75017 Paris.

26. INTERNATIONAL UNION OF BIOLOGICAL SCIENCES (IUBS) – BIOLOGICAL EDUCATION NEWSLETTER

In recent years, the Commission for Education of IUBS has produced 3 issues of "New Trends in Biology Teaching", designed to publicise recent work on biology education (see SEN 17.23.9).

Between these issues, which have appeared approximately once every two years, the Commission has considered it is necessary to maintain a more permanent contact; it therefore intends to edit, under the auspices of UNESCO, a periodical newsletter which will appear in English and French.

The aim of this newsletter will be to make known as soon as possible the major facts relating to the teaching of biology in different parts of the world: new curricula, materials, techniques of teaching and evaluation, important meetings, etc.

Those interested in receiving regularly a free copy of the biological education newsletter, and in contributing material to it should write to:

Madame J. Souchon, 10 rue Emile-Morel,
F-92330 Sceaux, France.

27. INTERNATIONAL CONGRESS ON THE IMPROVEMENT OF BIOLOGY EDUCATION, 8 – 12 SEPTEMBER, 1975.

The International Union of Biological Sciences (IUBS) is organising, under contract with UNESCO, an International Congress on the Improvement of Biology Education from 8 - 12 September 1975 at Uppsala, Sweden.

This Congress will be devoted to the problems of biology teaching at all levels, primary and secondary school, introductory university level, as well as for the general public and the specialised training of certain professions.

One particular objective of the Congress is to evaluate the development of this teaching over the last 4 or 5 years and to analyse its different aspects:

In the first place, biology courses must take account of new developments in biology and the needs of society.

Next, in recent years, emphasis has shifted from the mere memorisation of factual information to an understanding of concepts and the process of scientific enquiry. At the same time, certain countries have integrated biology into more general Science courses (Integrated Science).

Moreover, it is necessary to summarise findings of psychological research into processes of learning and to ascertain to what extent they should be incorporated into biology teaching.

New instructional equipment and educational technology, especially inexpensive equipment kits and so on, will be reviewed.

Following these analyses, the Congress also proposes the establishment of a 4-year programme of action; the problems of examinations and other assessments of student achievement will be studied, as will those of pre-service and in-service training of teachers.

Finally, the Congress will look into methods of improving the diffusion of innovation in biology education both within different national systems, taking into account local conditions, and between different countries throughout the world.

Further information and application forms can be obtained from:

D.F. Vohra
Division of Pre-University Science and Technology Education,
UNESCO,
7 Place Fontenoy, 75700 Paris, France.

or from:

Professor J.E. Kihlstrom,
Institute of Zoophysiology,
Box 560, S-75122, Uppsala, Sweden.

All applications received after 30 April 1975 will be considered only insofar as the national and overall quotas on participants have not been exceeded.

28. UNESCO PILOT PROJECT FOR TEACHING BIOLOGY IN AFRICA

(See SEN 8.30, 12.29)

The first of a series of books published on behalf of UNESCO by the International Council of Scientific Unions (ICSU) Committee on the Teaching of Science has recently been made available. It has been printed in Britain by the Association for Science Education.

The series is based on the proceedings of workshops held in French-speaking territories in Africa as part of the UNESCO biology project in Africa. These proceedings were subsequently translated into English and have been edited by Professor Peter Kelly, Centre for Science Education, Chelsea College, London. The first book based on a workshop held in Abidjan, is entitled "Principles of Ecology".

The book is in 3 parts – General Principles, The Savannas and The Marine Environment.

Copies of this book and subsequent ones in the series will be distributed through UNESCO or through the British Council offices in Africa to Ministries of Education but additional copies may be obtained from D.G. Chisman, Education Projects Department, British Council, 10 Spring Gardens, London SW1A 2BN (price £1.00).

29. SEMINAR ON "THE DEVELOPMENT OF SCIENCE AND MATHEMATICS CONCEPTS IN YOUNG CHILDREN IN AFRICAN COUNTRIES".

This seminar was held in Nairobi from 17 - 27 September 1974 under the auspices of UNESCO and UNICEF in conjunction with the Science Education Programme for Africa (SEPA). Its objectives were to share knowledge of work already carried out in this field, particularly that of Piaget and his co-workers, and also of work currently going on in African countries; to plan strategies for the development of studies in concept formation in the African situation, and how they may be used for the benefit of practical curriculum development in science and mathematics; and to suggest activities for the future. 25 Representatives from 11 African countries and 6 consultants including 4 from Britain took part in the seminar.

The 96 page report published by UNESCO/UNICEF outlines the organisation, progress and recommendations of the seminar, and summarises the papers presented by the consultants on topics covered by the above objectives. It is useful reading for anyone engaged in curriculum development in primary mathematics or science in Africa.

30. ENVIRONMENTAL SCIENCE EDUCATION

A one-week workshop entitled 'Environmental Science Education for Pre-Service Primary Teacher Education' was held in Nairobi in July 1974 under the sponsorship of UNICEF. UNESCO, SEPA, the Ford Foundation and the British Council provided a total of 16 consultants mostly from Africa. In addition there were 26 representatives from 15 African countries taking part.

The resulting 66 page report includes brief charts of the educational structures of the participant countries, including primary teacher training along with its objectives, particularly in relation to environmental science education. There are also brief accounts of 5 current projects relevant to environmental science at pre-service teacher level in Lesotho, Kenya (Teacher Corps), Sierra Leone, Nigeria (Mid West State), and Uganda (Namutamba).

For about half the time the workshop split into groups which produced the following reports:

A curriculum guideline for gaining scientific knowledge about the environment;

Using the environment to develop certain skills in children;

Identifying and solving important environmental problems;

Recommendations for future activities on a Pan-African basis.

It is hoped to hold a similar workshop for francophone countries in West Africa this year.

31. 17th LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT

This year's Youth Science Fortnight, organised by the Council for International Contact, will take place in London

from 30 July - 13 August. Approximately 400 students are expected to attend, of whom half come from the host country. Participants should be in the 17-22 age group and possess a good working knowledge of English.

The programme will include lectures on specialist science topics, a one day forum on "The Sea", seminars and discussion groups for exchange of ideas, presentation of papers by the participants, visits to various industrial and research establishments, film shows and a few optional excursions to places of interest near London. Accommodation will be provided in London University Halls of Residence, and the total coat of participation is expected to be around £83. This fee does not include packet money or travel costs to and from the conference.

Further information and application forms may be obtained from the Council for International Contact, 179-183 Fulham Palace Road, London W6 8QU.

32. FIRST AFRICAN EDUCATIONAL MATERIALS EXHIBITION – DIDAFRICA 76

This exhibition, the first of its kind, will be held from 2-8 February 1976 in Dakar, Senegal. It is being organised by the Brussels International Trade Fair, in conjunction with Dakar International Fair. The aim of the exhibition is to enable those connected with education in Africa at all levels to become acquainted with the very wide range of educational materials now available. Those included in the exhibition will range from the installation of special premises and laboratory equipment, to educational games, books, stationery etc.

Further details may be obtained from J. Isaac, Brussels International Trade Fair, Palais du Centenaire, B-1020 Brussels, Belgium.